



TECHNICAL GUIDELINES

1. 02010 -- Subsurface Investigation

These standards apply to the procedures and responsibilities of the contractor completing subsurface investigations of a site. The contractor shall be capable, following a thorough investigation of the site and related documents, to submit a bid which accurately anticipates the conditions to be encountered, scope of work, the requirements of the proposal, plans, special provisions, specifications, and addenda for performance of the work in full.

To assure the most complete investigation, the work shall be facilitated in the following manner:

1. Before any work begins, the contractor should request and participate in a meeting arranged by the Project Manager with the Plumbing and Electric Shop supervisors, to review the site.
2. The City of Seattle utility record plans should be examined. Old and new utility drawings are available on request through the Project Manager.
3. The Contractor shall request scheduling of utility or system shutdowns through the Project Manager who shall give adequate notice of the requirements to the shops and supervisors. City shops will perform all utility shutdowns and resumption of service.
4. The Contractor shall verify with the Project Manager work hour limitations on noise and the use of heavy equipment on City roads, sidewalks, and plantings.
5. Utility record drawings and soil boring records are deemed solely for the convenience of the Contractor and Architect, and the Owner shall assume no responsibility whatsoever for the sufficiency or completeness of the drawings or soil boring reports.



2. 02020 -- Topographic Survey

A. Scope

These standards and procedures apply to topographic surveys involving the field location and plotting of all natural objects and surface improvements.

B. Design Criteria

General Requirements

1. Surveying

- a. Survey accuracy shall be limited to that required for mapping purposes and shall, in general, be three times the map plotting accuracy.
- b. Horizontal control shall be State Plane coordinate system North Zone and grid lines shall be shown on the drawings.
- c. Vertical control shall be City of Seattle datum.
- d. A base line, when shown on location plan, will be physically located in the field and shown on the topographic map. It shall be referenced by coordinates and a bearing. Base lines will generally be established parallel to a face or major axis of proposed or existing buildings.
- e. Where existing survey data adjacent to or within the work area is available, the Project Manager will furnish such information to the surveyor. All surveying shall be done by Licensed Professional Surveyor. The surveyor must verify the present day accuracy of all data prior to incorporation into the work.

2. Mapping

- a. Preferred mapping scale is one inch to 20 feet with a scaled accuracy between random points on the map of 6 inches. Contour intervals shall be one foot, two feet allowable on steep slopes for clarity of drawing, with average allowable errors of one quarter the interval or six inches for improved ground surfaces. Unimproved surfaces may be twice this amount.
- b. All new work will be matched to existing survey maps to provide topographic continuity wherever possible.
- c. All one foot ground surfaces shall be represented on the drawings by means of contours with spot elevations shown in addition to contours at critical locations. Contours shall be shown at 1'-0" intervals.
- d. All ground floor elevations of existing buildings and slab structures shall be noted on the drawings to the nearest hundredth of a foot.
- e. Verify all storm and sanitary sewer inlet and outlet invert elevations at manholes by field measurements and enter such elevations on the map. Show underground storm and sanitary pipes.



- f. All buildings shown wholly or partially on the finished drawing shall be identified by name and accented by shading or crosshatching. In tubular form show major building corner coordinates.
 - g. Field locate, record location and identify on map all surface improvements and natural conditions.
 - h. Field locate all trees and major vegetation and record location on map. Identify tree size and type on map.
 - i. Locate all tunnels and manholes, show floor elevation of tunnels and tunnels coordinates.
 - j. Use City of Seattle monuments, show coordinates.
 - k. A general vicinity map, small scale, shall be included on the finished drawing. The Project Manager will furnish appropriate background, 50 or 200 scale for vicinity map.
 - l. Show all existing property lines, right-of-ways, and easements.
- C. Products - Not Applicable
- D. Execution
 - 1. Existing shrubs, trees and lawn areas shall be protected during the progress of the work and under no circumstances will their removal be permitted.
 - 2. Drafting and Layout Standards
 - a. All lettering on drawings shall conform to CADD standards in Appendix 1-E.
 - b. Drawings shall be on a dimensionally stable three mill, double matte mylar film. Diazo sepia, sepia mylar, slicks, or sticky back on mylar not acceptable.
 - c. Provide a 1/2-inch border on the top, bottom and right sides of the sheet.
 - d. Provide a 1-inch binding edge on the left side of the sheet.
 - e. Sheet sizes shall be 24" X 36" or 30" X 42" only.
 - f. All surveys are to be generated by Computer Aided Drafting (CAD), using AutoCAD 12, 13, 14 or update and coordinated with existing City of Seattle topographical data. All survey information shall be supplied to the City via electronic media. (See Appendix 1 – E CAD Standards & File Transfer Standards).



3. 02513 -- Asphaltic Concrete Paving

A. Scope

These standards and procedures apply to pavements constructed of asphalt concrete to include base courses, leveling courses, and wearing surfaces.

B. Design Criteria

Codes, Regulations and Standards

1. All work shall conform to the latest issue of the City of Seattle Standard Specifications for Road, Bridge and Municipal Construction.

Design Review and Submittals

1. Preliminary meetings shall cover anticipated vehicular and pedestrian routings, and emergency and maintenance access requirements.
2. The number of courses in the pavement cross section shall be shown on the plans or designated in the special provisions.

General Requirements

The finished surface of all asphalt concrete paving shall be dense, uniform in texture, smooth and free of hollows, depressions, roller marks, and surface cracks.

Specific Requirements

1. All sidewalks and walkways shall be constructed of 2" of asphalt concrete paving over a 2" compacted crushed rock base.
2. Some walkways that will double as service access ways for maintenance trucks, etc. shall be constructed of 3" of asphalt concrete paving over a 4" compacted crushed rock base.
3. All roads, streets and driveways shall be constructed of 3" of asphalt concrete paving over a 4" compacted crushed rock base.
4. All parking areas shall be constructed of 3" of asphalt concrete paving over a 4" compacted crushed rock base.
5. All patching of existing asphalt paved surfaces shall be to match the existing paving thickness (depth).
6. All overlays of existing asphalt paved surfaces shall be particularly specified for thickness (depth) and class of asphalt.

C. Products

The material from which Asphalt and Mineral Aggregate for Asphalt Concrete is composed shall comply to these standards.



1. Class B - modified or Class C asphaltic concrete shall be specified in the special provisions or designated on the plans.
2. The grade of asphalt concrete paving shall be AR-2000 or AR-4000 as specified in the special provisions or designated on the plans.
3. Mineral aggregate for Asphalt Concrete shall be manufactured from material meeting the following test requirements: Los Angeles Wear (ASTM Designation C 131) 500 Rev. 30% 35 Max.

D. Execution

These standards shall be complied with in the installation and placement of Asphalt Concrete Paving.

1. Asphalt Concrete Hauling

The Asphalt Concrete mixture shall leave the Mixing Plant at a temperature between 250 and 350F. and when deposited shall not be less than 250F. The mixture shall be transported in suitable dump trucks of sufficient size and shape to easily accommodate the load. When required by the engineer, each load shall be covered with a suitable tarpaulin while in transit to prevent unnecessary heat loss.

2. Preparation of Existing Surfaced Roads/Streets

- a. Before construction of an asphalt concrete pavement on an existing surface, all fatty asphalt patches, grease drippings and other objectionable matter shall be entirely removed from the existing pavement. The existing pavement shall be thoroughly cleaned by sweeping to remove dust and other foreign matter.
- b. A Tack Coat of emulsified asphalt applied at the rate of .02 to .08 gallon per square yard of retained asphalt shall be applied uniformly to all existing surfaces on which any course of asphalt concrete is to be placed, unless its omission is specified.
- c. The existing pavement shall be removed when it has been determined that such pavement is in poor condition, and the crushed rock base shall be reconstructed. This shall be shown on the plans or designated in the special provisions.

3. Preparation of Asphalt Patches

- a. Where existing asphalt concrete pavement upon a granular base is required to be removed due to deterioration and/or settlement, the area shall be uniformly defined in size and shape. The existing asphalt shall be removed by cutting pavement vertically at a sufficient distance of at least 6" over the undisturbed base surface, and then the affected pavement shall be broken up and removed.
- b. The granular base under the removed pavement shall be restored so as to correct the condition that caused the deterioration and/or settlement, and this shall be shown on the plans or designated in special provisions.



4. Preparation of Asphalt Pavement on Existing or Constructed Unsurfaced Subgrades.

Prior to the first application of asphalt, the entire area to be paved shall be constructed of specified granular base material (crushed rock) which shall be stable and unyielding, be of medium damp condition, be free from irregularities and material segregation, and be true to line grade and cross section. All castings shall be covered and weighted for protection.

Where concrete curb or curb and gutter exist, they shall be protected with a splash board so as to prevent spraying thereon.

5. Miscellaneous Details of Construction

- a. Unless otherwise specified, construction of one course or lift upon another shall not proceed until the underlying course is completely cooled and set.
- b. Asphalt Concrete Mixture shall not be deposited on a road if the rolling cannot be completed before dark. The placing of asphalt concrete mixture at night shall not be permitted.
- c. Where the Asphalt Concrete is to be placed against a concrete or stone curb or gutter, or against a cold pavement joint or any metal surface, a thin tack coat of asphalt shall be applied in advance of the placing. The application shall be thin and uniform. Avoid accumulation of asphalt in depressions.

6. Unfavorable Weather

Asphalt for "prime coat" shall not be applied when the ground temperature is lower than 50F. or unless otherwise specified.

7. Testing

- a. Testing and inspection of paving shall be conducted in the presence of the contractor (or representative), and City representatives.
- b. The finished surface, when tested with a 10-foot straight edge, shall reveal no deviations in excess of 1/4".
- c. Core samples, 4" in diameter, shall be taken at the owner's discretion to verify total asphalt thickness. When the results are approved, the contractor shall patch all the test holes to the satisfaction of the inspector.



4. 03000 -- Structural Reinforced Concrete

A. Scope

The standards and procedures apply to the design and execution of all reinforced concrete construction.

B. Design Criteria

Codes, Regulations and Standards

All work shall conform to the following codes of latest issue:

1. Seattle Building Codes and Uniform Building Code adopted thereunder.
2. American Concrete Institute Building Code Requirements for Reinforced Concrete (ACI 318).
3. American Concrete Institute Standard Specifications for Structural Concrete for Buildings (ACI 30I).
4. Manual of Standard Practice for Detailing Reinforced Concrete (ACI 315).

Design Review and Submittals

1. All plans, specifications and computations shall be completed by an Engineer/Architect licensed by the state.
2. All project designs and specifications shall be submitted to the owner on a progressive basis as the design develops.
 - a. A schematic design review should include schematic plans for a structural system and a written description of its applicability.
 - b. A review during the design development phase should minimally include a structural section, typical floor framing plan, and main member sizings.
3. Final drawings will show all expansion joints, construction joints, concrete strengths, finishes, and load limits for floors, ramps, and decks.
4. Detailed reinforcing shop drawings showing and identifying all bars and tendons, shall be prepared by the contractor's supplier and submitted to the engineer for formal review and approval before fabrication.
5. All building permits and vacations, and fees associated therewith, conveying permanent construction rights and occupancy to the owner, will be obtained and paid for by the owner. Construction permits of a temporary usage nature shall be obtained by the contractor at no expense to the owner. It shall be the consultant's responsibility to see that all permanent permit requirements are included in the final contract documents.

General Requirements



While projects and completed structures may vary widely, the principles of design must be cost effective in design and construction. A few suggestions follow:

1. Standardize bar grades, sizes and lengths as far as possible.
2. Beam and girder sizes and spacings should be uniformly chosen.
3. Stories should be of uniform height, with lower floors of greater height if needed.
4. Maintain column cross-sectional areas constant for at least two stories. When necessary, change column thickness only with an inside face setback.
5. Free standing interior columns should be circular and of constant diameter per story. Reinforce with spiral hoops rather than with isolated ties.
6. Provide the maximum reuse of forms for all cast-in-place concrete work. This requires repetition of design features throughout the project.
7. Minimal dimensions of column and beam sides should be in multiples of 2 inches.
8. Locate cold joints so that shoulders are available to anchor subsequent concrete lifts.
9. Provide keyways at all construction joints and include continuous water stops wherever subjected to hydrostatic pressures.
10. Slope the top of all exposed concrete surfaces and include drip grooving underneath all cantilevered leading edges.
11. Major transitions in section, such as occurs at a tunnel/building interface, shall be squared-off and isolated. Provide a bossed wall opening to support and laterally restrain the tunnel end. Allow for differential tunnel movement and water stop if necessary.
12. All below grade exterior wall pipe penetrations shall be made with special cast iron flange to mechanical joint wall castings of matching length with integral intermediate flange. Interior face flanged with a mechanical joint exterior for flexibility and extend beyond the wall line with at least one length of ductile iron pipe.

Sleeve and curb all floor slab openings.

Specific Requirements

1. Concrete mix batch weights along with bulk specific gravity determinations shall be required for all selected aggregates based on saturated surface dry (SSD) conditions. This mix information must be sufficient to verify through absolute volume calculations the concrete's yield, cement factor, water/cement ratio, and mortar to voids ratio as a primary basis for mix acceptance.
2. Mix ingredients and proportions shall be such as to work readily into corners and around reinforcing without segregation and undue shrinkage while achieving the standard deviation in specified strength. Final mix shall be based on either laboratory test batches or field experience with standardized mixes.



3. All admixture usage must be justifiably cost effective and result oriented. Admixture usage is not a substitute for sound concreting practices.

The following are guidelines for their proper application.

- a. Admixtures containing compounds either accelerating or retarding set times without water reduction are discouraged.
- b. Water reducing admixtures may be used to increase slump and workability without increasing mix water-useful when placing concrete by pumping.
- c. The use of superplasticizers to temporarily increase mix fluidity above the specified maximum design slump must be considered whenever strength dictated low water/cement ratios interfere with successful concrete placement and consolidation. Such applications include all of the higher strength concrete mixes, pumped concrete placements, and thin section construction wherein shrinkage must be minimized.

The job site addition of a superplasticizer shall be specified and monitored by the structural engineer.

- d. Air entrainment admixtures shall be specified for all slabs exposed to natural weathering and freeze-thaw cycling. Do not use with high early, strength type III cement. Reduce mix water by approximately one gallon per sack of cement whenever air entrainment is used; a vinsol-resin type at 1/2 to 1-1/2 fl. oz. per sack of cement.
- e. Fly ash, a resource conservation and recovery material, used as a direct substitute for Portland cement in mix quantities of 20% to 30% of the weight of cement improves workability while allowing a corresponding percentile reduction in mix water; and maintaining the same cement to water ratio.

Today, when a major percentage of concrete placement is by pump, the use of fly ash is strongly recommended as a viable alternate to sand. Set time may double for comparable strengths and this may require fly ash mix reductions where early entry slab work is concerned.

4. Concrete strengths shall be as noted on the drawings, but in no case less than 4000 psi at 28 days.

Fill concrete of 2000 psi compressive strength shall be used to reestablish base of footing elevations in all cases of footing over excavation.

5. All cold joints that are exposed to the weather or subject to hydrostatic water pressure must be water stopped. All below grade walls and slabs subject to hydrostatic water pressure must also be protected with a two to three ply layer of membrane waterproofing, otherwise dampproof. All slabs-on grade must include a below-slab gravel capillary break and a foundation ground water collection and drainage system.
 - a. Expansion joints or contraction joints shall be provided at periodic intervals and at all changes in concrete section to offset member restraint, and shall be continuous throughout the breadth and depth of the effected member. Interrupt



all exposed slab-on grade and other thin wall sections at 30 feet or less - a simple construction joint with a suitable delay in adjacent placements will suffice for interior work. All others must be full depth separations with appropriate clearances and means for shear transfer. Fully locate and detail on the drawings.

- b. Seismic joints closely parallel expansion joint, with the notable exception of providing total structural freedom across the joint.
- c. Construction joints shall be uniformly spaced at forty foot intervals throughout the structure to facilitate the work and limit shrinkage, and shall be located and detailed on the drawing. Key for shear transfer and carry reinforcing through the joint. Always provide sufficient temperature/ shrinkage reinforcing to uniformly distribute shrinkage cracks. Waterstop as dictated by the presence of ground water.

Locate joints perpendicular to beam centerlines whenever possible and carry through into walls and footings with minimum offsets.

- 6. Reinforcing shall be continuous across construction joints. Terminate reinforcing with appropriate setback at all expansion/ contraction joints. Provide integral key ways for shear transfer across any and all such joints.
- 7. Clear span requirements may require pre and or post tensioning of long span members. Special design attention must be given to the long term effects of member shortening and creep cambering, and particularly so in the case of continuous members. If continuity must be established at the supports, weld only at the top to avoid compromising the member's gravity load-carrying ability or design the bearing support members for full longitudinal load ductility.

C. Product

1. Cement

Cement shall conform to the Standard Specification for Portland Cement ASTM Designation C-150, Type I or Type III.

2. Aggregates

Aggregates shall be composed of clean and natural crushed Steilacoom gravels complying with ASTM Designation C 33. Maximum size of coarse shall not exceed one-fifth of the minimum concrete section or three-fourths of the minimum clear distance between reinforcing bars.

3. Water

Mix water shall be of potable quality, free from oils, acids and injurious amounts of organics or salts.

4. Concrete



Ready-mix Concrete shall be utilized wherever locally available, subject to plant approval. Fully executed and signed trip tickets shall accompany each load and shall be logged in at the job site by the inspector with the time of entry. Re-tempering of concrete that has taken its initial set will not be tolerated, nor shall the adding of mix water without authorization is allowed.

5. Reinforcing

Deformed bars shall be of appropriate ASTM 305 designation or cold drawn welded wire fabric of ASTM-185 specification. All hard grade reinforcing shall be marked with red paint at the bar ends, in addition to the standard tagging. Store on platforms up off of the ground.

6. Waterstops

Use polyvinyl chloride hollow dumbbell waterstops with continuous splicing where joint is spaced and subject to movement. Use flat ribbed polyvinyl chloride with continuous splicing all other cases.

D. Execution

1. Forms may be of wood, steel or fiberglass. Exposed surfaces shall be equal in appearance to that of plywood. Forms shall be mortar- tight and sufficiently strong and rigid to resist deformation.

Form ties shall be steel rods of adequate strength, providing a minimum 1-inch break back from the surface.

2. Form all vertical footing surfaces. Remove all water from form work - by pump from an outside sump, if necessary. Forms shall be true, rigid, tight and clean.
3. A non-staining mineral form oil compound must be applied before any reinforcing is installed.

Wood forms shall be oiled and, except in freezing weather, wetted immediately prior to concrete placement.

4. All reinforcement and embedded items shall be securely fastened, inspected, and approved by the inspector before pouring operations may be started.
5. Runways or other means of conveyance shall be provided to allow placement of the concrete in its final location.
6. Existing concrete surfaces to receive new concrete shall be cleaned, roughened and given a 1/2" coat of cement grout prior to placement of new concrete. Grout shall be of same cement and fine aggregate proportions of the concrete to be placed.
7. Vibrate concrete in its final location to a uniform and homogeneous mass. Vibration by means of approved portable vibrators shall be done only to the degree necessary to produce a dense well-compacted concrete free from honeycomb and voids. The contractor must have on hand at all times at least one spare vibrator equal in performance to that in service.



8. Curing of formed surfaces shall be accomplished by moistening with forms left in place for the full curing period. Bulkheads may be removed to permit forming and pouring of adjacent wall sections.

Unformed surfaces shall be covered with burlap or sand and kept wet. Slabs may also be spray-coated with a membrane curing compound. The pigmented curing compound shall be applied in two transverse coats of not less than one gallon per 200 square feet of surface each.

9. Forms shall be removed at such times and in such manner as will guarantee the safety of the structure. Primary supports for elevated slabs shall not be removed before 28 days in the case of regular cement usage. Other mix ingredients may affect this time and any such primary shoring removals must be verified by break strength tests of at least two job cured cylinders. Note that equivalent strength for pozzalamic (fly ash) concrete mixes may require 58 days.
10. Forms sufficiently free from damage may be reused after being cleaned.
11. Finishing shall follow immediately upon form removal and patching. Patch with mortar of same proportion as the concrete and minimum water content after saturating the area to be patched.

Standard finishes are of two classes and all finishes shall be noted on the drawing.

- a. Class A

A dry surface honed to a uniform and even color and texture throughout, followed by a wet bagged (burlap) rub with 1 part Portland cement and 1-1/2 parts fine sand. When dry, remove excess grout with a second sacking.

- b. Class B

Remove irregularities by chipping and grinding. After wetting, bag as before.



5. 04000 -- Masonry

A. Walls

1. This discussion is directed toward all masonry wall material i.e., brick, stone, terracotta, ceramic tile, CMU, etc. The City has and assumes it will continue to have a multitude of masonry designed buildings which consist of single and double wythe composite masonry bearing walls, shear walls and veneer masonry. This section is meant to highlight good masonry practices found to be essential within our buildings.

B. Design Criteria

1. During the Design Development phase of new buildings, an overall scheme/theory shall be presented. This scheme shall anticipate locations of horizontal, vertical and seismic expansion, contraction, control, and building movement joints. In addition, it shall anticipate thru wall flashing and the protection of parapet masonry.

It is suggested that during the Design Development phase, the architectural team of architectural designer, structural engineer and masonry consultant coordinate their design effort to provide a cohesive design solution through an understanding of masonry reaction with other building materials.

C. Specific Requirements

1. All masonry units shall be above grade.
2. Masonry roof parapets shall have their roof face protected.
3. All Masonry Walls shall have expansion/contraction joints.
4. Joints for expansion, contraction, building movement and seismic design criteria shall be sealed to prevent weather and water from penetrating to the interior of the building. All vertical and horizontal joints shall be drained to daylight above all horizontal surfaces. There shall be both a primary (architectural) weather seal and a secondary weather seal where water and moisture could penetrate the wall, i.e. "Emseal, J-M. Bellows, Etc.
5. Stainless steel and copper thru-wall flashing shall be provided at wall caps, window heads, ledger angles, base bearing, etc.
6. All Masonry anchors shall be Hohmann and Barnard DW-10HS, DW-10S (2+2), hot galvanized, 12 gauge, Vee Wall Tie, hot galvanized, 3/16" or 1/4".

D. Product

1. All masonry unit design mixes shall be proven design mixes with a minimum of 15 years of product history. The unit shall have been tested for water absorption and freeze/thaw cycling which is compatible with the local weather extremes. The masonry wall shall meet the Seattle Building Code requirements as well as the design criteria set forth by the structural engineer for bearing, shear, expansion, and contraction.
2. Care shall be taken in the installation of the masonry units to prevent structural and face damage as well as discoloration from excessive concrete and mortar slobbering,



staining and discoloration from moisture and adjacent materials. On completion of the masonry and a reasonable setting and drying period, the masonry shall be cleaned with products acceptable to the masonry manufacturer. Upon completion of cleaning the masonry walls shall be sealed with a water seal which is compatible with the masonry units and compatible with the cleaners used.

3. Masonry water sealing should be specified as part of Masonry contract.
- A. Scope - Masonry Pavers for Floor, Deck and Courtyards
1. Masonry units used for flooring, deck, and courtyards. Shall be units specifically designed for pedestrian and vehicular traffic. These units shall be set and sloped in a logical and positive manner away from all buildings and to drains. The paver design shall include expansion joint where required and at all vertical planes.
- B. Design Criteria
1. During the Design Development phase, the architect, structural engineer, mechanical/plumbing engineer, and masonry consultant shall provide a design concept outlining the criteria for expansion, contraction and drainage of all surfaces.
- C. Specific Requirements
1. All structural slabs substrata above all spaces shall slope and shall have perimeter curbing at building walls, seismic joints and other openings where water proofing substrata will terminate and protect spaces below. Drains shall be so designed that they are either sumps within or below the structural substrata or shall have their flow line at the low point of the sloped structural substrata.
 2. All surfaces shall be sloped 1/4" per foot away from the building and shall be designed to free flow water to an exterior surface. The masonry walking surface shall also be sloped to drains and away from building walls. Interior drains should be avoided.
 3. All walls resting on masonry curbing shall rest on and over said curb providing an adequate drip and cover cap for this curb. It shall simulate flashing.
 4. Seismic joints in all structural slabs shall have curbs, the seismic joint shall have a gutter drain system attached below the structural slab, a secondary water seal between structural slabs and a primary (architectural) water seal at the visible surface. At the walking surface the seismic joint should be armor plated and meet the requirements of disabled persons.



6. 05000 -- Metals

A. Scope

These standards and procedures apply to the design and erection of structural steel.

B. Design Criteria

Codes, Regulations and Standards

All work shall conform to the following codes, regulations, and standards of latest issue:

1. Seattle Building Code and Uniform Building Code adopted thereunder.
2. Manual of Steel Construction, American Institute of Steel Construction, Inc. (AISC)
3. Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.
4. Code of Standard Practice for Steel Buildings and Bridges, AISC.
5. Specification for Structural Joints Using ASTM A325 or A 490 Bolts.
6. Tower designs shall be in accordance with Electronic Industries Associates (EIA) Standard RS-222 of latest issue or the Local Building Code, whichever is the more stringent.
7. Arc welding electrodes shall conform to AWS D1 for filler metal. Use as recommended by manufacturers for the actual positions and conditions of use.
8. A Guide to Shop Painting of Structural Steel by SSPC & AISC.

Design Review and Submittals

1. Shop drawing reviews shall focus particularly on fabrication methods to assure that changes in this area do not affect the design mode of failure.

General Requirements

1. The use of higher strength steels with their higher yield points and reduced sections should force the designer's attention on variables other than strength, such as: lack of ductility and susceptibility to corrosion; unbraced lengths of compression elements, and width/thickness of plate elements (compact section). In these regards:
 - a. Control web buckling by selecting appropriate beams rather than stiffening the web panel. The unstiffened girder may weigh more, but its overall cost will be less.
 - b. Lateral buckling of the compression flange is usually resisted in simple beams by diaphragm slab resistance. Continuous beams may require supplemental bottom flange bracing at the point of support. When the support is a free-standing column, they both are in need of lateral support at this point.



2. Design all bolted connections (such as coped webs of simple beams or gussets in shear) so that the net areas of connecting elements equate favorably with the members gross section.
3. Connections
 - a. Use ASTM490 high alloy strength bolts for high strength steel jointing. Tighten to specified AISC tensions. Use ASTM A325 bolts with mild steels such as ASTM A36.
 - b. Maintain same bolt size throughout job with constant 3-inch spacing.
 - c. Rigid frame connections should be welded to develop joint for full ductile frame action under seismic loading.
 - d. Welded joints subject to impact and fatigue shall be butt (grooved) welded. Square butt up to 3/8-inch. Single bevel up to 1/2 inch with welds from both sides over 1/2 inch in thickness, may be combined groove and fillet for economy. Fillet weld for static loads only.

Welds shall be designed for transverse loading rather than longitudinal shear whenever possible.
 - e. Avoid embrittling weldments perpendicular to rolled surfaces whenever possible. Studs 1/2-inch and over must be annealed to induce stress relief during cooling.

Avoid weld combinations of higher strength steels in thicker sections, requiring a large amount of weld material and joint restraint. When unavoidable; select more ductile electrodes, press and weld from the center of mass outward.
- C. Material

Select A36 steel whenever possible. Where higher strength is needed, use A441 for its improved weldability and consider A572, GR.50 for heavier sections. Avoid the use of all high strength steels in corrosive atmospheres.
- D. Execution
 1. Field welding shall be shielded metal arc; shop welding shall be submerged arc. Use low hydrogen, dry, electrodes only.
 2. Work shall be executed by certified welders only.
 3. Clean all surfaces and paint with one coat of shop paint per SSPC, Paint 13; exception is surfaces to be encased or fire protected.



7. 07000 -- Thermal and Moisture Protection

A. Scope

This discussion is directed toward all thermal and moisture protection which could be considered a roof. These services include but may not be limited to slate roofs matching the historical character of the campus, standard built up roofs, gutters and downspouts, moisture protection in, around and over subterranean tunnels and rooms, moisture protection under walking deck materials and over habitable spaces, moisture protection as a walking surface, etc.

It is the intent of this section to describe the needs of thermal and moisture protection which City has found to provide the best long term acceptable solution to maintaining comfortable and dry buildings. Any deviation from NARC standards of coping and flashing must be approved in writing.

B. Design Criteria

Design Review and Submittals

1. Design Criteria

At the Programming and Schematic Design phase the design consultant shall formalize plans for positive drainage of water from roofing surfaces, decks, plaza areas, building periphery, etc. prior to the investigation of thermal and moisture protection materials.

2. Preliminary Design Phase Submittals:

- a. Preliminary thermal and moisture protection systems specifications. This should include an outline specification of all types of materials to be used and the location.
- b. Preliminary plans and details:
 - 1) positive drainage plan of roof, decks, plazas and sidewalk areas.
 - 2) drainage system and preliminary details.
 - 3) all major system edge details.
 - 4) all major system penetration details.

These preliminary plans should telegraph from architectural to structural to mechanical. A design concept of sloping the structural substrata to maintain a positive drainage system with a coordination of mechanical into areas which will not interfere with the structure. The specifications and details will be reviewed primarily by the Project Manager and the City's roofing maintenance staff, the documents can be conceptual sketches and should clearly indicate the intended system, applications and terminations.

3. Specific Requirements

- a. Structural roof decks must be constructed as follows:

The structural shall reflect a positive slope as depicted in the architectural plans to provide positive slope under the finished surfaces. This slope shall be a



minimum of 1/4" per foot. Where possible this slope should slope to the exterior of the building.

- b. Where the structural system provides roof slope to the exterior walls, drains with exposed scupper systems are preferred. The visible run down of water from clogged drains through scuppers draws attention to the building and gets the maintenance required.
 - c. Drains not at exterior walls must be located at points of maximum deflection of the roof structural deck. Drains shall be located off of center line so as not to interfere with columns, beams and bearing walls. All drains shall be located in sumps. All drains shall be lead flashed with 4 lb. per square foot lead.
 - d. Expansion joints must be provided to adequately accommodate all movement of the structure. This shall include but not be limited to seismic, expansion, control, etc.
 - 1) All joints where movement is anticipated shall have a primary barrier with architectural features, a secondary barrier that is drained to the exterior at all transition points. All horizontal expansion joints shall have an interior gutter with drain system that drains to the exterior.
 - 2) All expansion joints particularly those which abut existing walls shall have an 8" curb above the waterproof membrane plane. These joints shall be adequately flashed and counter flashed and/or tied to through wall flashing from the existing building.
 - 3) Structural deck shall slope away from expansion joints or parallel to the joints.
 - e. A 4 or 5 grid 3/4" hose bib and 110 electrical service shall be installed in a service pocket.
4. Integration of Moisture Protection System with other Surfaces:
- a. Counter flashing shall have adequate coverage. Counter flashing shall extend down and cover a minimum of 1" of any adjacent materials.
 - b. Parapets shall have roof base and reinforcing extended up a minimum of 1'-0" with clamp bar and adequate cover of flashing.
 - c. Coping with adequate flashing coverage.
 - d. Penthouse walls shall have roof base and reinforcing extended up a minimum of 1'-0" with clamp bar and adequate flashing. Through-wall flashing may be required.
 - e. Skylights/roof hatches shall have curbs that extend a minimum of 1' above the adjacent membrane surfaces. All roof hatches and skylights shall have crickets on the up hillside of each unit.



- f. Roof mounted equipment shall have vibration dampening, concrete slabs as well as vibration isolation mechanisms for support.
 - g. Planters shall float above roofing membrane.
 - 5. Design for Roof Foot Traffic.
 - a. Designs should deter easy roof access accept for periodic inspection and maintenance by authorized personnel. The design should limit casual access through windows, over parapet walls, etc.
 - b. Penthouses should have direct access from within the structure. Designs for new facilities shall emphasize all mechanical equipment in the penthouse. Our desire is to eliminate all roof mounted equipment and restrict foot traffic from the roof. Simplified roof areas reduce the likelihood of leaks.
 - c. Roofs that require foot traffic shall be designed so that a walking surface extends from roof access point to mechanical equipment, ladders, etc. All access points, ladders, etc. shall have hard protective walking surface at entry point.
 - 6. Moisture Protection Edge Details.
 - a. Parapets. It is recommended that all flat/low-slope roofs have parapets. Parapets shall have a permanent water proof coping, cap or cap stone. Copper cap flashing is preferred. All parapets involving masonry shall have the back vertical surface covered. Cap stones and masonry shall have stainless steel through-wall flashing that extends over the moisture protection system.
 - b. Termination of Moisture System on Vertical Walls. All moisture protection systems shall be terminated with a clamping bar with reglet and flashing above.
 - c. Scuppers and Overflows. Scuppers and overflows (where used) shall be through-wall so that water cascades down the side of the building when roof drain is clogged. This ensures quick maintenance.
 - d. Cants. Cants shall be installed in all curbs, seismic joints, parapet walls, mechanical equipment bases, skylights, roof hatches, etc.

C. Products

The City may, at their option, require prequalification of any moisture protection system.

- 1. "Quality Assurance" All products shall be specified having manufacturer's warranty and roofing contractor's warranty.
- 2. The City is looking to use products that are familiar, sustainable, and are proven in the field. These products should be compatible with the existing roofs on campus, and be maintainable by the City carpentry shop.
- 3. Due to the nature of roofers and materials, high tech systems and details are discouraged. The design team should rely on slope and a multiply system.



D. Execution

1. Quality Assurance. Installation of the moisture protection system shall be in strict accordance with the technical specification of the system manufacturer.
2. All construction traffic over existing or over new roofs shall be restricted and a protective runway or working surface installed.

Approval shall be sought by equipment contractors for movement of all equipment too heavy for one man to carry on a roof deck. Specific methods and procedures for transporting and setting equipment is required for the approval.

3. Testing agencies/observation. The City will engage at its own expense a person to observe the installation and a testing agency to test all moisture protection systems.
 - a. The contractor is to provide, as soon as possible but at least 9 weeks (when possible) prior to installation, the City with:
 - 1) Shop drawings.
 - 2) Complete list of all materials and items proposed for complete system installation.
 - 3) Letter from roofing manufacturer confirming compatibility of all products to be used, including insulation, caulking, and mastics.
 - 4) Manufacturer's applicable instructions and modifications to meet warranties.
 - 5) Information as to time of the application (schedule).
 - 6) Representative sample materials requested for testing.
 - 7) Full and ample means and assistance for testing.
 - 8) A moisture analysis and roof cuts are required as part of final inspection procedure, and again at least two months prior to expiration of roofing guarantee.
 - b. Contractor shall provide and pay for corrective measures including additional and more complete testing.
 - c. The Inspector shall have the authority to mark and reject all materials which do not comply with the specifications provided, all materials which are deemed to be wet, damaged and unacceptable to the installation, and shall advise the Project Manager of all defective installation work.

E. Standard Specifications for Quality Assurance

1. Guarantee

In addition to the requirements of the General Conditions deliver to the City prior to final payment for work, a written guarantee signed by the contractor agreeing to maintain the moisture protection system installation in a water tight condition for at least 2 years from the date of acceptance of the work by the City. Further, guarantee that all workmanship and materials in the total moisture protection system are as specified and as recommended by the manufacturer.



2. Warranty

The materials manufacturers shall provide a written warranty, including a flashing endorsement, for a period of ten years from date of project acceptance, agreeing to provide all labor and materials necessary to correct all defects in the thermal and moisture protection systems, including water entry or abnormal deterioration of materials. Included in the warranty is the responsibility for removal and replacement of all work concealing the moisture protection system.

3. Manufacturer's Qualifications

- a. Must be a nationally-recognized manufacturer in good standing with the National Roofing Contractors Association.
- b. Must have had a minimum of twenty years continuous service manufacturing roofing products.
- c. Must have at least five approved applicators of proposed system located within 200 mile radius of project site.
- d. Must be able to show five installations similar to the proposed system within a 200 mile radius of Seattle.
- e. Must have an engineering service representative available full time to conduct daily inspection of application.

4. Installer's Qualifications

- a. Must be a certified applicator of the approved thermal and moisture protection system manufacturers. Provide a copy of certification.
- b. Must have had a minimum of five continuous years of experience with similar system applications.
- c. Must be able to show two installations, at least two years old, similar to proposed system, in satisfactory condition.
- d. Installer must maintain a full-time supervisor/foreman on job site during all times work is in progress. Supervisor must be certified to have had a minimum of five years experience with applications similar in nature and scope to specified system.

F. Preliminary Application Meeting

At least 10 days after delivery of submittals and at least 6 weeks prior to scheduled commencement of system installation, installer shall schedule a preliminary meeting with the owner, installers of substrate construction and other work adjoining the system including penetrating work and roof-top units, representatives of approved primary materials manufacturer, architect, and representatives of other entities directly concerned with performance of the system. They will:



1. Review requirements (contract documents), submittals, status of coordination work, availability of materials and installation facilities and establish preliminary installation schedule.
2. Review requirements for inspections, testing, certifications, forecast weather conditions, governing regulations, insurance requirements, and proposed installation procedures.
3. Record discussion including agreement or disagreement on matters of significance; furnish copy of recorded discussions to each participant. Discuss system protection requirements for construction period extending beyond installation. Discuss possible need for temporary roofing.
4. If meeting ends with substantial disagreements, the installer shall determine how disagreements will be resolved and set date for reconvened meeting.

G. Final Application Meeting

Approximately two weeks prior to scheduled commencement of system installation and associated work, meet at project site with installer, installer of each component of associated work, installers of deck or substrate construction to receive roofing work, installers of roof-top units and other work in and around roofing which must precede or follow roofing work (including mechanical work if any), representative of approved primary materials manufacturer, contractor, architect, owner, and other representatives directly concerned with performance of the work. Record discussions of conference and decisions and agreements or disagreements reached and furnish copy of record to each party attending. Review foreseeable methods and procedures related to roofing work, including but not necessarily limited to the following:

1. Tour representative areas of substrates, inspect and discuss condition of substrate, roof drains, curbs, penetrations, and other preparatory work performed by other trades.
2. Review structural loading limitations of decks.
3. Review system requirements including drawings, specifications, and other contract documents.
4. Review required submittals, both completed and yet to be completed.
5. Review and finalize construction schedule related to roofing work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
6. Review required inspection, testing, certifying and material usage accounting procedures.
7. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions, including possibility of temporary roofing (if not a mandatory requirement).

H. Existing Roof Protection Requirements

Protection of existing roofs shall require:



1. Authorization for access to or use of existing roofs shall be issued only by the Project Manager or other authorized representative.
2. Entire roof surface shall be thoroughly inspected by a team including the Project Manager and a contractor's representative. A written documentation of any existing roofing flaws will be signed and dated by both team members.
3. All existing roof areas adjacent to new additions and/or new construction shall be protected during the period of construction by a minimum of 1" rigid foam insulation covered with a 3/4" thick layer of exterior grade plywood.
Secure to the existing roof using weights or other attachment as necessary to avoid blow-off and so as to not penetrate the roofing to remain.



8. 07050 -- Below Grade and Plaza Roofs

A. Scope

These standards and procedures apply to roofs located over occupied spaces, or mechanical and electrical spaces, which are below grade and covered with earth or walking surfaces, and above grade roofs which are developed as plazas for landscaping, planters, and pedestrian circulation.

B. Design Criteria

Codes, Regulations, and Standards

All products, materials, equipment, and installation work shall conform to the following codes, regulations, and standards of latest issue:

1. American Standards Association
2. Factory Mutual Standards
3. National Roofing Contractors Association Roofing and Waterproofing Manual
4. Seattle Fire Code
5. Underwriters Laboratories Standards
6. Uniform Mechanical Code
7. Uniform Plumbing Code
8. Washington State Energy Code
9. National Electric Code

C. Products, Materials and Equipment

The waterproof membrane shall be manufactured for submerged installation.

D. Execution

1. Soils reports and the drawings shall graphically identify water tables using both Seattle datum references.
2. Proposed floor elevations shall be tied to Seattle datum elevations.
3. Joints in concrete slabs-on-grade and foundation joints shall have water stops.
4. A subgrade perimeter drainage system is required, and in some cases, underslab drainage.



5. All seismic joints, expansion joints, perimeter joints, joints at shaft walls, that cannot be successfully provided with water stops, shall have vertical curbs that extend one foot minimum above the waterproof membrane; and appropriate flashings.
6. The structure shall slope one-quarter of an inch per foot minimum (valley) away from all joints and carry water to drains at the sloped structural deck or over the edge of the foundation wall. The design of the structure shall enhance the slope as building creep relaxes.
7. No upset beams or appendages shall impede the flow of water.
8. Installation of conduits, piping, etc., shall be discussed with the Project Manager and electrician.
9. Conduit and piping shall not penetrate the horizontal waterproof membrane.
10. Area drains shall be designed to accept the complete rate of flow from a 100 year storm as contributed from the deck, adjacent walls, and other run-off without requiring water storage on the deck surface.
11. Area drains shall be installed within sloped/depressed areas in the structural slab. The clamping ring shall engage the membrane at this point. Grate extensions shall not be used. Side rim weep holes are inadequate and impede water flow. A separate surface grate is required.
12. The waterproof membrane shall extend up sidewalls or curbs a minimum of one foot or a minimum of four inches above block pavers, sidewalk or planting soils. The membrane shall be terminated with a clamping bar, caulking, and stainless steel flashing.
13. Seismic joint covers shall be mechanically fastened to the building through a full bed of sealant.
14. Vertical joints shall be installed with continuous interior and exterior gaskets. At transitions (floors, roofs, etc.) the gaskets shall be installed shingle fashion over through-wall flashings.
15. Horizontal joints shall be designed with armor plate guard, gasket, and interior gutter drain system. Vehicular traffic areas shall be fully supported; designed for H-20 load. The joint shall be the high point, or a curb at the adjacent building, with positive slope away from the joint. Stainless steel flashing at side walls and over up-set curbs shall be tent-like and adequately cover the vertical surfaces.



9. 08700 -- Finish Hardware

A. Scope

These standards and procedures apply to the selection and installation of finish hardware.

B. Design Criteria

Codes, Regulations, and Standards

All work shall conform to the following Codes, Regulations and Standards of latest issue:

1. The Uniform Building Code
2. The Seattle Building Code
3. National Fire Protection Association Standards
4. Conform to the requirements of the State Fire Marshal.
5. Hardware to be installed on UL doors or frames to be as approved by the National Board of Fire Underwriters.

Design Review and Submittals

1. Specification

The consultant shall prepare, as part of the contract documents, a door schedule referenced to a specification for finish hardware and hardware groups.

2. Finish Hardware Schedule:

- a. Upon being awarded the finish hardware contract, the finish hardware supplier shall submit for approval, in six copies, a complete schedule of finish hardware required.
- b. Schedules must be completely detailed in vertical form including all quantities, stock numbers, finishes, and sizes. List hardware for each opening separately. Schedules in horizontal on coded form are not acceptable.
- c. Format for Schedule (Sample Only):

HW 1 ONE SINGLE DOOR 101, CORRIDOR 100 FROM ROOM 101, LHR 90,
 3'0" X 7'-0" X 1-3/4 W X HM 20 MIN

| | |
|----------------|-------------------------------|
| 1-1/2 pr Butts | BB179 US26D 4-1/2 X 4-1/2 |
| 1 Lockset | 796L-L9555 US 32D X CLS X WBX |
| 1 Closer | P120 SBL X SNB |
| 1 Kickplate | 5014 - 8 x 34 - 410 |



1 Wall Stop W 9 US26D

3 Silencers 33

- d. Approval of the finish hardware schedule shall not relieve the hardware supplier of the responsibility of errors or omissions.
- e. After the schedules have been approved, make any necessary corrections and send two revised copies to the Contractor for their use during construction.
- f. At the completion of the project three copies of as-built hardware schedules including keying shall be sent directly to the Owner. Carbon copies of the transmittal letter shall be sent to the General Contractor and the Architect. As-built specifications shall include information for doors, closures, locks, controls, and related hardware, including model, make, manufacturer, and supplier.

3. Keying Schedules

After receipt of the approved finish hardware schedule, the hardware supplier shall prepare a keying schedule. The keying schedule shall then be discussed with the Architect and/or Owner of the project to ensure all locksets are functionally correct and keying fulfills the desires of the project Owners. Copies of the proposed keying schedule shall be given to the Architect and/or Owner with all corrections inserted in the proposed schedule.

4. Templates

Hardware for application to metal shall be made to template. After receipt of the approved finish hardware schedule, provide metal door and frame manufacturers with two revised copies of the finish hardware schedules and blueprint templates (or template numbers if the manufacturers have template catalogs).

Templates and hardware schedules shall be provided no later than ten days after approval of hardware schedules.

Specific Requirements

- 1. Doors - Total door type with rod/cable hinge entire length with full latching.
- 2. Locksets and Latchsets

To diminish the damage to and subsequent expense of replacing bored or cylinder locks, all doors and handles/spindles most susceptible to abuse shall be heavy-duty mortise type.

3. Locking Systems

The number of lock functions shall optimally be restricted to the least possible number that will permit proper functioning and use of the building. Cypher locks may be used where appropriate or required by program.



4. Panic Hardware

Provide panic exit hardware as required by the Uniform Building Code, N.F.P.A. pamphlet #101, or if more restrictive, by the Seattle Building Code. Avoid the use of pairs of doors with vertical exit devices wherever possible. Provide single doors with fixed or removable mullions and heavy duty rim type devices.

5. Keys and Keying

- a. Insofar as possible, restrict the number of master key groups for each building to the least number that will permit convenient operation. If at all possible, no more than 10 master key groups should be specified for one building.
- b. Avoid maison keying when possible. Instead of maison keying, provide additional change keys for distribution to different departments or individuals as required.
- c. Provide 6 pin cylinders for all locks.
- d. Mechanical rooms, electrical rooms, toilet rooms and access doors (where required) shall be keyed alike to the City (Schlage) maintenance key.
- e. The exterior doors of new buildings shall not be passed by interior keys.
- f. All locksets for an individual project shall have one key-way.

6. Door Closers

- a. All doors on required exiting corridors will be rated 20 minute with self-closing devices and latching hardware.
- b. Janitor closets generally require doors with 20 minute rating. To facilitate their closure, but discourage the propping open of doors - all should have 180 deg. hold open and self-closing device with fused arm link.
- c. Offices are arranged in suites with a common hallway leading to an exiting corridor. In such an arrangement, the offices shall have doors rated 20 minute lock sets and no door closer. The hallway door to the existing corridor shall be rated 20 minutes, self closing and latching. In most cases, a magnetic hold-open feature with adjacent smoke detectors connected to the fire alarm system shall be incorporated. These standards apply to arrangements with one hallway exit for less than 30 people or two exits for a maximum of 50 people.
- d. Door closers shall not be required on access doors and panels that are only opened under custodial supervision. This shall include access panels in public corridors, doors in shafts or pipe chases, and electrical/telephone closets (3 feet deep or less).

C. Products

- 1. Comply with "Quality Assurance" qualifications for suppliers.
- 2. No substitutions of material will be accepted unless reviewed and accepted by the Architect ten days prior to bid opening.



3. The following lists accepted manufacturers:

| <u>Item</u> | <u>Manufacturer</u> |
|-----------------------------|-------------------------------------|
| Cylinders | Corbin / Schlage |
| Butts | Stanley-McKinney |
| <u>Item</u> | <u>Manufacturer</u> |
| Exit Devices | Sargent |
| Locksets and latches | Corbin / Schlage |
| Closers | LCN/Rixor (4041) with hold out arms |
| Door Stops | BBW |
| Push/Pull Plates | Cipco |
| Kickplates | Cipco |
| Thresholds and Weatherstrip | Pemko |

4. All hardware is to be furnished with proper fastening devices to coordinate with conditions of the work.
5. All hardware items to be packed in their original factory shipping cartons. The hardware supplier shall mark each item of hardware individually for each opening as to location of installation in accordance with approved hardware schedule.
6. Hardware items vary in finishes. These will be discussed with the Project Manager.

Butts
 Locksets (cypher locks)
 Exit Devices
 Closers
 Door Stops
 Kickplates

7. Butts
- Butts sizes vary.
 - Outswinging Exterior Doors shall have NRP feature.
 - Quantity per door:
 - Doors under 90" shall have 3 butts per leaf
 - Doors over 90" shall have 1 butt added for each 30" of height



8. Locksets and Latchsets
 - a. Locksets and latchsets shall be heavy duty mortise type with 3/4" antifriction latchbolt.
 - b. Provide curved lip strikes sufficient to protect trim.
 - c. All locks shall have wrought box strikes.
 - d. Dead bolt functions shall be 1" projection.
9. Exit Devices
 - a. Exit devices shall be push bar type.
 - b. Exit devices shall have reinforced crossbars.
 - c. Exit devices for labeled fire doors shall be fully UL approved and furnished less dogging feature.
10. Closers
 - a. All closers shall be sized as recommended by manufacturers catalog though consideration should be given to any wind conditions or mechanical ventilation systems that might affect sizing requirements.
 - b. If, after the closers are installed, a larger size closer is required, the hardware supplier shall furnish the larger size at no additional cost to the owner.
 - c. Closer for wood and mineral core doors shall be furnished with hex-nut and bolt type fasteners.
 - d. Closers shall be guaranteed against mechanical defects for a period of five years.
11. Door Stops
 - a. Contractor shall provide proper backing appropriate to wall construction for all wall-type stops.
 - b. Stops applied to concrete shall be fastened with steel tampins and machine screws.
 - c. Where wall stops are specified, but cannot be used because of a construction detail, floor stops shall be furnished.
12. Pushes and Pulls

Push and pull plates shall be cut for cylinders or fitted with thumb knobs as required to fit deadlocks or night latches.
13. Kickplates, Mop Plates and Armor Plates
 - a. Exterior plates shall be stainless steel, 0.05" minimum thickness.



- b. Interior plates shall be plastic or brass, .125" minimum thickness.
- c. Kickplates shall be a minimum of 8" high and 2" less door width.

14. Key Cabinet

Provide one key cabinet with capacity for all specified keys plus 50 percent expansion.

D. Execution

- 1. Contractor shall install all locks and cylinders.
 - a. Furnish all standard cylinder items with construction cylinders and/or a construction master key system (and 6 keys).
 - b. Upon completion of the work, the hardware supplier in the presence of the owner, shall verify fit and operation of each lockset with the proper change key which voids the construction key. The keys shall then be tagged with the door number and delivered to the owner.
- 2. Provide two sets of any special tools required for installation and maintenance of hardware to the owner.
- 3. Send all master keys and change keys via registered mail to the Project Manager.
- 4. All hardware shall be located as recommended by ASAH, BHMA, SDI, and NAAMM and/or per the manufacturer's instructions.

E. Standard Specification for "Quality Assurance"

- 1. Supplier
 - a. Finish hardware shall be supplied by recognized builders' hardware supplier who has been furnishing hardware in the same area as the project for a period of not less than 5 years.
 - b. The suppliers' organization shall employ consultants who are available at all reasonable times during the course of construction to meet with the owner, architect, or contractor for hardware consultation.
 - c. The supplier shall maintain a stock and parts inventory of all items supplied for future service to the owner.
 - d. Provide manuals with model numbers, parts "blow-up", installation instruction, warranty information and name of local supplier.



10. 10000 -- Toilet Rooms

A. Scope

Toilet room locations shall be easily located and visible. Convenience and adequacy are important to the people who work in a facility, and can be the subject of employee grievances. Restrooms also influence visitors' impressions of the institution. It is, therefore, important that the Design Team correctly assess restroom needs of each area before construction plans are finalized. Restrooms are to be functional, bright, and clean in appearance. They need to be easily accessible to the disabled, particularly those in motorized wheel chairs. In addition to the criteria contained herein, designers shall review security provisions outlined in Crime Prevention Through Environmental Design (CPTED) in the design of restrooms and adopt applicable measures.

B. Design Criteria

1. Location

Restrooms shall be located in a manner that will logically serve the projected population. They should generally be:

- a. Accessible and convenient to everyone, employee or visitor;
- b. Not more than 75 yards from any work station;
- c. On the same floor as the population they are intended to serve;
- d. Separated by sex when more than 3 employees are to be served;
- e. In a location with visibility to prevent crime/vandalism;
- f. Accessible to disabled.

2. Sizing

When remodeled areas or redefined work areas require construction work, existing restroom facilities will be reviewed to assure they continue to meet the needs of those they are intended to serve; expanded facilities may be required. If possible restroom sizing should take into account present and future use occupancies.

3. Minimum Requirements

- a. The appropriate section (staff or student use) of the current IAPMO
- b. Uniform Plumbing Code, Appendix C, schools, and others (colleges, universities, adult centers, etc.) shall be the basic reference and guide for the number and type of fixtures.



TOILETS

URINALS/LAVATORIES

FOUNTAINS

Customer areas:

| | | | | | |
|------|--------|------|------|--------|------|
| Male | Female | Male | Male | Female | Both |
| 1:30 | 1:20 | 1:30 | 1:30 | 1:20 | 1.75 |

Assume 60% women's and 40% men's - Size piping for stadium type usage.

Employee areas:

| | | | | | |
|--------|--------|------|------|--------|------|
| Male | Female | Male | Male | Female | Both |
| 1:1-15 | 1:1-10 | 1:40 | 1:40 | 1:40 | 1:75 |

2:16-35 2:16-35

3:36-55 3:36-55

Over 55, add 1 fixture for each additional 40 persons.

4. Design

Standard restroom design shall include:

- a. wall-hung toilet(s) and urinal(s);
- b. wall hung lavatories(s);
- c. hard, smooth, water resistant easily cleanable floors and walls (to at least 5 feet high); partitions should be made of materials that are easy to clean and maintain (not stainless steel)
- e. lockable counters supply and exhaust ventilation; sufficient for cu.ft. of space;
- f. adequate and pleasant lighting and possibly occupancy sensors;
- g. paper towel dispenser(s); roll-type; surface mounted; roll-type; 1 per 2 lavatory;
- h. waste receptacle; free standing; 1 per restroom dispenser;
- i. liquid soap dispenser(s); surface mounted; 1 per lavatory;
- j. mirror with shelves; 1 per lavatory plus 1 extra;
- k. standard and handicapped fixture(s)/stall layout when applicable;
- l. fire sprinkler(s);
- m. Texas roll toilet paper dispenser; surface mounted; 1 per toilet;
- n. sanitary napkin disposal; surface mounted; 1 per each women's toilet; *Sanitary napkin dispensers also.
- o. door push plates; plastic laminate of adequate size (12"x18" or 12"x24")
- p. door kick plates: stainless steel (12" high by door width minus 1")
- q. toilet partitions: floor mounted, textured surface, and anti-graffiti or graffiti resistant
- r. toilet stall doors with coat hooks on the interior side. Interior door locks
- s. non-corroding wall-hung urinal stall divider(s)
- t. grout for tile should be tinted light brown or grey (NOT WHITE)
- u. pull-down metal shelf in women's toilet stalls.

Men's toilet rooms shall contain a minimum of 1 urinal, 1 toilet and 1 lavatory in addition to the standard items.

Women's toilet rooms shall contain a minimum of 2 toilets and 1 lavatory in addition to the standard items. Urinals shall not be used.



Fixtures, (except lavatories and urinals) shall be separated from each other by partitions for privacy and to minimize splash.

Toilet rooms should be designed for and equipped to use paper towels; electric hand dryers may be used (in addition to paper towels) for high usage areas.

Room design shall include locked storage space for paper products. This room or closet shall be large enough to hold cases of the following: toilet paper, paper towels, toilet seat covers, liquid soap, etc.

C. Products

All toilet rooms vary somewhat. The following represent the preferred standardization for purposes of maintenance, spare parts, etc., and consumable products management. Verify specific requirements with the Project Manager.

*Products and dispensers to remain consistent with current + prod. + disp.

Plumbing Fixtures and Trim:

| | |
|----------------------------------|---|
| Wall Hung WC | American Standard "Afwall" No. 2257.103 or Kohler "Kingston" K-4330 |
| Floor Mount WC | American Standard "Madera" Aquameter \$2234.015 or Kohler "Welcomme" #K-4350 |
| Floor Mount WC w/Tank | American Standards "New Cadet Aquameter" #3081, 017 bowl, #4086.025 tank |
| Shower valve | Chicago #1762-15 |
| WC Seat | Bemis 19555SC - Black |
| Urinals | American Standard "Washbrook" 1 gallon per flush |
| Flushometers - WC | Sloan Royal #115-15 or Regal #111 |
| Flushometers - Urinal | Sloan Royal #186-1 or Regal #186-1 |
| Lavatories, Wall hung | American Standard "Lucerne" No. 0355.012; Kohler "Kingston" K-2005 |
| Lavatories, Wallhung, Wheelchair | Kohler "Morningside" K-12636; K13885 Offset drain; American Standard #9141-011 |
| Lavatory Faucet | Delta #525mpu |
| Service Sinks | American Standard "Florwell" #7740.020 with drain fitting; Kohler "Whitby" k-6710 with drain fitting. |
| Service Sink Faucet | Chicago #897; or Chicago #305-VB-R |
| Scullery Sink | Elkay Weldbilt WNSF-8248-LR w/Elkay LK-25-RT drains |
| Scullery Sink Faucet | Chicago #445-L8 |
| Kitchen Sink | Elkay "Lustertone" LR-3322 |
| Kitchen Sink | Elkay "Lustertone" LR-3322 |
| Kitchen Sink Faucet | Delta #400 |
| ADA Drinking Fountains | Elkay or Haws |
| ADA Water Cooler | Elkay or Haws |



Toilet Rooms Accessories:

1. Most accessories shall be surface mounted.
2. Mirror: Bobrick B-290; for handicapped lavatories: B-293;
Mirrors on separate walls to have bookshelf: B-292;
3. Soap dispenser: Kimberly Clark 92551 or equivalent.
4. Paper towel dispenser: Kimberly Clark 097006 or equivalent. Sized to fit 800'x 8 in. size rolls.
5. Waste receptacle: 15 - 44 gal. standing cans.
6. Toilet seat cover dispenser: Standard size 1/2 fold Fort Howard 5000 Bobrick, B-221
stainless.
7. Toilet tissue dispenser: Texas Roll type 2100' x 4.
8. Sanitary napkin dispenser: Bobrick B2800 surface mounted or Bobrick B35007 recessed.
9. Sanitary napkin disposal: Bobrick B-270; one per each women's toilet;
10. Grab bars: Bobrick B-6237; B-6206; (coordinate with dispensers).
11. Pull-down metal shelf:
12. Bookshelf: Bobrick B-298; 42 inch.
13. Drinking fountain: Bobrick handicapped accessible. No drinking fountains in restrooms.
14. Baby Changing Station: surface mounted "Koala Bear Kare" or equal.



11. 10050 -- Service Areas and Loading Docks

A. General

Loading areas for City equipment transported by forklifts from one building to another must have a smooth, level or gradual slope. If possible, access should be separate from, or in addition to, truck delivery loading dock where stage equipment that is delivered by truck for an event is unloaded.

1. A critical part of every building design is development of an adequate service area for the facility. The minimum requirement for a building is a defined service area. Larger buildings or buildings with highly technical programs usually require significantly greater service delivery and waste management provisions. Maximum requirements include a highly refined service area with loading dock provisions for several major vehicles simultaneously, waste collecting/recycling holding areas and special containers, bottled gas storage, service vehicle parking, etc. Building programs are seldom explicit about the requirements. It is the consultant's responsibility to identify the extent of requirements during the schematic and design development phases of each project and then incorporate all associated provisions into the contract documents.
2. In general, a separate service entrance with loading dock is preferred for nearly every building, such as: custodial services deliveries; mail delivery and pick-up; waste collection and removal; recycling; maintenance; delivery services (U.P.S., Federal Express, etc.); local delivery and service vehicles (food products, beverage trucks, vending machine maintenance, office machine maintenance, computer maintenance, City transportation services, bottled gas, instructional media, etc.; long haul deliveries of major scientific apparatus; general contractors and subcontractors; movers; etc. Considerable care must be exercised in regard to minimizing conflicts with provisions for disabled persons.
3. Service areas and loading docks must be carefully located in consideration of the many other design features of the building and adjoining existing buildings. Of critical importance are outdoor air intakes, which must be protected from contamination. Corrective air filtration systems (e.g., charcoal filters) are not acceptable alternatives due to high maintenance costs.
4. The following requirements must be considered in the course of completing the design. The operational success of the facility is largely related to how well these considerations are merged into the finished product.

B. Service Areas

1. Among its many leadership roles, the City must set the standard for proper waste management. Consequently, the City recognizes a wide range of waste products that require special handling: e.g.; acceptable "land fill" waste; recyclable waste; chemical waste; etc. To do so effectively requires space and appropriate special provisions, including convenient, all-weather access. Provisions must be scaled to suit the requirements of the facility. Various scales may be mentioned in following paragraphs. They are noted only to set a beginning point for design discussions.
2. Recycle materials are generally picked up upon demand. Therefore, a collection and sorting room or site is advisable. This should be about a 150 square foot space with a roll-up door to protect paper and other material from arson and vandals. This area may be



used to sort plastic, aluminum, glass, paper, and cardboard. Some facilities need to have capacity to dump City dumpsters, other areas need place for larger containers.

3. Sharps are glass, syringes, and other similar items that may or may not be recyclable and require special disposal methods. Area requirements must be coordinated with tenants.
4. The City may use many different sizes of waste containers. Specific requirements shall be determined by City Consultants in consultation with the tenant.
5. Container length may vary where compactors are required. Compactor head (loading chute) can increase the container length by twenty five feet. Requirements at each location shall be coordinated with City and the current vendor.
6. Waste containers shall be placed on reinforced concrete pads. Pads for forty yard containers shall be designed for 60,000 pound loading.
7. Dumpsters and compactors shall be easily accessible from the building interior using wheeled pushcarts and waste containers. Therefore, service areas must be on the same elevation as an at-grade floor, or ramps must be provided accordingly.
8. The haul truck for waste containers requires sixty feet in front of the container for maneuverability.
9. The entire "truck bed" area adjoining loading docks must be level to ensure that the truck bed is level when parked at the loading dock. This is required for the safety of the users.
10. Service areas shall include catch basins and trench drains to ensure good drainage under worst conditions, recognizing that wind driven trash and debris can easily collect and block inadequate drainage provisions. Positive, gentle slopes must ensure water-free working areas. Inlets must not be located under compactors and containers where they are inaccessible for convenient cleaning. Odor control is important.
11. Compactors generally require 440 volt power.
12. The minimum provision for service area cleaning is a cold water hose bibb. Service areas with large waste containers or compactors must be provided with hot and cold water service to a hose-reel, with hose suitable for the entire area.
13. Adequate illumination shall be provided for full use of the service area at night, and for safety and security; using industrial quality, weather-resistant luminaires.
14. Walls surrounding service areas should be concrete. Walls that are finished to suit other adjoining characteristics must be provided with protective curbs, bollards, pipe rails, or whatever is required to ensure that normal waste handling activity and truck traffic will not destroy the surfaces and appearance. This includes protection for walls behind dumpsters that become damaged by the less-than-careful opening of lids, etc. Areas near dining areas must be designed to control odors.
15. Insofar as reasonably possible, service areas and loading docks should be aesthetically screened. Although some landscaping may be appropriate in closely surrounding areas,



do not locate landscaping in the service area that requires regular attention by grounds personnel.

16. Appropriate signage and graphics are to be included (No Parking/Danger) etc.

C. Loading Docks

1. The Washington State highway clearance standard is fourteen feet, six inches. Canopies and dock covers must meet this requirement as a minimum. Dock areas that are totally covered must be designed to maintain clearances as trucks maneuver over ramps. The lifting of waste containers requires seventeen feet six inches clearance.
2. Maximum dock height shall be four feet. Docks shall have spring loaded levelers or a scissors lift and be able to accommodate truck bed heights from twenty-four inches to forty-eight inches. Such equipment must be rated for heavy duty in order to meet all service requirements and minimize maintenance.
3. Minimum stall width shall be ten feet. Docks shall have a minimum of two stalls: one stall for twenty-four inch step vans and one stall for city or long haul vehicles.
4. A ramp may be required for a fork lift; minimum width shall be eight (8) feet; maximum slope shall be one in ten.
5. Loading docks often become informal staging areas. Therefore, it is important to provide an array of 120 volt, 20 amp duplex receptacles with weather resistant cover plates.
6. Loading docks are attractive habitats for a variety of birds and rats. Consequently, it is imperative that protruding appurtenances be held to a minimum. Sprinkler pipes, lights, conduits, roof supports, etc., which might hang or protrude from loading dock ceilings and walls shall be recessed or enclosed so that birds and rats will find it impossible to use them for nesting or roosting. Similarly, cracks, crevices, and separations between walls and ceilings or dissimilar construction material (e.g., metal roofing adjoining cement walls or ledges) shall be sealed flush. I-beam ceiling supports must be concealed.

D. Dumpster Enclosures

1. All facilities must have a designated area for dumpster storage. This area may require screening such as walls, fencing, and gates and landscaping, depending upon the area. City Maintenance staff shall be consulted early in the design process to determine design requirements.
2. Space for three standard dumpsters must be provided. A footprint of the standard front load dumpster is 82" wide by 36-70" deep, depending upon the yardage capacity. All front load dumpsters are 82" wide.
3. Driveway access to dumpsters must be provided. The total width of dumpster hauling trucks is 10' minimum. The overhead clearance must be considered because a front loading truck will need 21 feet to dump the garbage in the top of the truck. A flat level approach (for the truck) of 35 feet to the dumpster collection area is also necessary and the dumpsters should sit on a flat level surface.



4. A compaction system saves space and money. In addition, the following amenities shall be provided:
 - Sufficient lighting
 - Access to water supply should be recessed into wall
 - Surrounding area shall be composed of smooth surfaces that lead to a sewer catch basins drain
5. Site Receptacles: Waste collection and source separation begin with the proper selection and placement of equipment and the functional design of integrated recycling collection systems. Waste receptacles shall be a minimum of 48-gallon capacity with easy customer access. Containers must be of enclosed design to prevent pest access. Recycle containers shall have a capacity of not less than 32 gallons and match the waste receptacle in design. Waste receptacles shall be spread conspicuously throughout the grounds and with a density sufficient to support heavy customer use.

E. Miscellaneous

1. For buildings of about 25,000 gross square feet or larger, it is desirable to locate a variety of service facilities inside the building in close proximity to the loading dock. This includes a specifically designated service elevator. It also includes a custodial delivery and storage room of no less than 200 square feet.
2. Due to the rough usage building areas adjoining loading docks experience, it is important to design accordingly by providing heavy duty floor and wall surfaces with protective wainscots and bumper guards on corners.



12. 10100 -- Custodial Requirements

A. Scope

Included with the Volume 2 Standards Drawings (SD) is a diagram of a typical custodial closet. It shows the relative sizes and positions of typical equipment that a custodian would use to maintain a building. Additional space should be allocated to facilities with permanent (fixed) seating.

Besides the depicted items, additional supplies and equipment must fit into the blank spots and shelving. These include: tissue, towels, seat covers, 20+ gallons of chemicals, pails, brooms, floor pads and scrubbing brushes, safety signs/traffic cones, vacuum accessories, extension cords, chalk, small liners, medium liners, extra dustmops, spare waste receptacles, pick-up barrel, and miscellaneous cleaning items. Recent safety concerns dictate that heavier or bulky items occupy lower spaces and shelving not exceed a certain height.

While it is unlikely that every such closet would house an autoscrubber, each one should have adequate space to accommodate certain bulky items of equipment for special projects such as stripping/waxing, carpet-cleaning, etc. and not interfere with normal work. Some space is also allotted for work clothes, limited personal belongings and a chair to assist in changing clothes.

In buildings that require an autoscrubber it is necessary to provide a place to charge its batteries.

Five types of custodial space are required:

1. Bulk Space: 200 square feet per major building, preferably located near a loading dock;
2. Primary Working Closets: 120 square feet; serves the needs of the assigned area for each custodian (approximately 25,000 to 30,000 square feet).
3. Supplemental Working Closets: 70 to 80 square feet per floor that does not include a Primary Working Closet. This closet will provide convenient access to water and serve as an additional working area. In major buildings, these should be alternated with the primary spaces, depending on the number of floors and keeping the 25,000 to 30,000 square feet figure per custodian in mind. In the event that storage space is not possible, a working closet becomes mandatory for each floor so that bulk cases can be stored within.
4. Custodian Dispatch Office: Provide for specific projects; consult the Project Manager.
5. Miscellaneous Storage: These rooms should be free of mechanical systems and built to store a variety of objects.

B. Design Criteria

Space and Specialties Required for Custodial Closets:

1. Bulk Storage Area

In major buildings (25,000 square feet or larger) and in some existing buildings being remodeled (space study required) provide a 200 square feet room near loading dock; configuration to allow storage of case paper products and drum chemicals;



- a. Door width: 60 inches; out swinging;
 - b. Lighting: Fluorescent; H10, incandescent where dimming is necessary for ambient lighting;
 - c. Electrical: 110 volt duplex receptacle near door;
 - d. Plumbing: Floor drain in center;
 - e. Ventilation: Mechanical exhaust; 12 air changes/hour;
 - f. Shelving: 16 inch deep; adjustable height; three rows at 3'-6", 5'-0", and 6'-6" above the floor, with brackets to the ceiling; full length of longest wall.
2. Primary Working Custodial Closet (one per each 25,000-30,000 square feet).
- a. Dimensions: 10 feet by 12 feet;
 - b. Door width: 42 inches; out swinging;
 - c. Lighting: Fluorescent;
 - d. Electrical: 110 volt duplex receptacle near door;
 - e. Plumbing: Floor drain in center; floor-mounted custodial sink with stainless steel splash shield on wall; locate near doorway;
 - f. Ventilation: Mechanical exhaust; 12 air changes/hour;
 - g. Combination mop hanger/drying rack: Bobrick B-224; locate near sink;
 - i. Shelving: 16 inch deep; adjustable height; three rows at 3'-6", 5'-0", and 6'-6" above the floor, with brackets to the ceiling; full length of longest wall;
 - j. No utility panels or pipe chase accesses in closet;
 - k. Closets should not be located inside restrooms;
 - i. Typical supplies and equipment to be stored would consist of: paper supplies for 3 to 4 weeks, wet/dry vacuum, standard buffing machine, canister vacuum, high-speed polisher, custodial cart, upright vacuum, (2) mop buckets, up to 20 gallons of chemicals in plastic 1 gallon containers, brooms, wet mops, spare dust mops, pails, cleaning supplies, wall mounted chemical (liquid) dispensing unit.

Add wall mounted chemical (liquid) dispenser unit.

3. Supplemental Working Closet
- a. Dimensions: 10 feet x 7 or 8 feet
 - b. Door Width: 48" out swinging;
 - c. Lighting: Fluorescent;
 - d. Electrical: 110 volt duplex receptacle near door;
 - e. Plumbing: Floor drain in center; floor-mounted custodial sink with stainless steel splash shield on wall; locate near doorway;
 - f. Ventilation: Mechanical exhaust; 12 air changes/hour;
 - g. Combination mop hanger/drying rack: Bobrick B-224; locate near sink; mount on wood locker.
 - i. No utility panels or pipe chase accesses in closet;
 - j. Closets should not be located inside restrooms.

Utility Services Throughout the Facility:

Duplex receptacles for commercial grade custodial cleaning and polishing equipment shall be generously located through-out the facility; rated 20 amp, 110 volt. Circuits shall be served by 20 amp breakers, which are independent from circuits serving offices, or other building uses; located as follows:

Isolated offices on the grounds have separate neutral for computer equipment.



Buildings that service events have special electrical requirements.

1. Corridors: 40 feet on center;
2. Entrances/exits: On both sides of the door opening where equipment can be plugged in and not become a direct tripping hazard and where receptacles will not be blocked by furnishings;
3. Stairways: at all floor landings. Lighting must be accessible for maintenance.
4. Large public circulation areas: 40 feet on center on walls; on "free-standing" columns; located so as not to be blocked by furnishings.

Building Entries:

Because of Washington's mild, damp weather, tracking of water and granular fines is a year-round occurrence. Design should include transitional walk-off areas to reduce floor covering wear and maintenance costs. These walk-off areas should include depressed slab areas for coarse, medium and fine spun plastic/vinyl walk-off mats.



13. 14200 -- Conveying Systems

A. Scope

These standards and procedures apply to the design and complete installation of dumbwaiters, passenger and freight elevators. Escalators and moving walks shall comply with the general guidelines but will require specific consultation between the Project Manager and the design consultant.

B. Design Criteria

Codes, Regulations and Standards

All work shall conform to the following codes, regulations and standards of latest issue:

1. Seattle Building Code
2. National Electrical Code
3. NFPA No. 8
4. State of Washington Statute WAC Chapter 296-81, 296-92
5. American Standard Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks (ANSI/ASME A17.1)

Design Review and Submittals

1. The pre-schematic design meeting should include discussion of anticipated traffic volume and type of use, handicapped access, and appropriate elevator locations.
2. The contractor shall submit to the consultant and owner the following shop drawings and information for review and approval:
 - a. Plans, elevations and details of car enclosures and hoistway entrances.
 - b. Excavation requirements for the jack.
 - c. Elevator diagrams showing service to each level.
 - d. The general arrangement of elevator equipment.
 - e. Cuts or drawings of fixtures.
 - f. Vertical and horizontal hoistway sections for each elevator showing bracket spacing, estimated forces on rails and estimated forces in pit.
3. Balance of technical specifications must be approved by Project Manager's Office prior to acceptance of working drawings.



General Requirements

1. Use hydraulic elevators for buildings up to five floors unless anticipated high traffic volume merit the use of traction elevators.
2. Use traction elevators (with variable speed drive) for buildings with six floors or more.
3. Hydraulic elevators shall be piston-type (rather than telescopic) provided site and soil conditions do not prohibit the excavation and installation of the plunger-cylinder unit, nor subsequent corrosion of materials.
4. All units shall have solid state controllers, with Selective Collective Operation. MG sets are not acceptable.
5. When two elevators are scheduled in a group operation, they shall be duplex, three shall be triplex, etc.
6. A fire recall system should be provided for all elevators. Confirm designated primary and alternate recall floors with the Project Manager and the Seattle Fire Department.
7. Seismic detectors shall be installed for traction elevators per the recommendations of the American Standard Safety Code for Elevators.

Standard Requirements

1. Public use elevators (especially those in exposed or generally unsupervised areas) shall have tamper/vandal-proof signals for both the cab and call stations. Lighting systems shall also be tamper/vandal-proof in the above situations.
2. All City elevators require floor identification numbers in braille adjacent to control buttons and they must meet other ADA requirements.
3. Car interiors shall generally be appropriate for the building.
4. A non-slip and easy-to-clean surface shall be specified for the floor finish.
5. Brakes should have sufficient power to stop and hold the car with 125% of rated capacity.
6. Hoist cables shall be terminated in suspension rope equalizers of the individual compression spring type.
7. Car roller guide shoes should be specified to have a minimum diameter of 6 inches.
8. On geared machines, provision shall be made to manually bring car to floor level in case of complete power failure.
9. Location and isolation of machinery spaces should be reviewed to assure adequate sound attenuation.
10. Electrical Work:



- a. The power supply will either be a 480Y/277 volt, 3 phase, 4 wire grounded or a 208Y/120 volt, 3 phase, 4 wire grounded system.
- b. The lighting supply will most likely be 208Y/120 volts.
- c. Confirmation of current characteristics shall be furnished to the elevator contractor before commencing work.
- d. All wires in the travelling cables must be terminated on a terminal board with permanent identification matching that used in schematic diagrams.
- e. All relays, switches, resistors, overload devices, fuses, timers, etc., mechanically or electrically operated, shall be permanently marked with identification matching that used in the schematic design.
- f. All devices shown in all schematic diagrams shall be identified to the satisfaction of the owner.
- g. All field wiring must terminate at each control cabinet on approved and properly identified terminal strips. Field wiring shall not terminate on equipment or relay studs. All control wiring shall be of stranded construction.

C. Products

- 1. The elevator subcontractor must pre-qualify his firm no later than ten days prior to the bid opening by completely filling out the "Elevator Submittal Sheet" furnished by the Owner and submitting satisfactory evidence that he has:
 - a. Plant and facilities adequate to produce and install the complete elevator.
 - b. Personnel thoroughly experienced in each phase of design, manufacture, installation and service.
 - c. Experienced personnel able to provide service without delay.
 - d. Repair parts and special tools locally available.
 - e. The ability to produce the "Reference Documents" called for under the Execution Section of this Standard. The vendor must provide the Project Manager with a sample of the "Reference Documents" complete in all respects demonstrating the kind of "Reference Documents" material that will be supplied the Owner under the contract. All material will be held in strict confidence and returned to the bidder if requested. The successful bidder must leave the sample material on file with the Project Manager until all "Reference Documents" have been supplied in conformity with the contract.
 - f. Failure of an elevator subcontractor or manufacturer to comply with the above requirements will be sufficient justification for disqualification.



2. Guarantee:

The elevator contractor shall guarantee that the materials and workmanship of the apparatus installed by him under these specifications are first-class in every respect and that he will make good any defects not due to ordinary wear and tear or improper use or care, which may develop within one year from date of acceptance.

D. Execution

1. Preparatory Work

Preparatory work in conjunction with the elevator installation will be done by the general contractor and will consist of the following:

- a. Providing a legal hoistway properly framed and enclosed and furnishing a pit of proper depth. Providing a properly lighted and ventilated machine room. Also access doors and guards as required. Furnishing in place as located on drawings, all steel channel door frames, beam supports for machinery, door sill angles and supports for guide rail brackets. Guarding and protecting the hoistway during the time equipment is being installed.
 - b. Furnishing and installing light outlets in pit as required by Code.
 - c. Supplying electric feeder wires to the terminals of the elevator control panel and include necessary fused main line switch or circuit breaker in proximity to control panel. Providing hoistway outlets for the car lights, light in pit, and machine room outlet for the elevator signal equipment as well as general machine room fluorescent illumination. Furnishing the required electric power for testing and adjusting the elevator equipment. Furnishing during the erection of the elevator, power, as necessary to provide illumination, operation of required tools and hoists, and power for starting, testing, and adjusting the elevator.
 - d. Providing channel door bucks and sills where vertical bipartisan counterbalanced freight type doors are specified.
 - e. Doing all cutting of walls, floors or partitions together with any repairs made necessary thereby.
2. Prior to installation, the installer shall examine the hoistway and machine room to verify that no irregularities exist that would affect the quality of execution of work. Written notification of any discrepancies should be submitted to the contractor and Project Manager. Work shall not proceed until problems are corrected.
3. Testing
- a. Upon nominal completion of elevator installation, and before permitting use of elevator (either temporary or permanent), perform acceptance tests as required and recommended by Code and governing regulations or agencies.
 - b. Final acceptance of the installation shall be made only after all field quality control inspections and tests are completed, all submittals and certificates have



been received the contract speed, capacity, floor to floor performance, and door operation comply with the specification.

- c. The contractor shall furnish personnel, equipment, and instruments to perform required tests for acceptance of the equipment in accordance with Code and specification requirements, including the following:
 - (1) Insulation Resistance Test: Test safety circuit, door lock circuit, loop circuit, and motor and generator field circuits at 500 volts. Minimum resistance to ground one megohm.
 - (2) Running Test: With equipment within 5 degrees of ambient machine room temperature, perform the following:
 - (a) Place thermometers in hoist motor, exciter and generator windings.
 - (b) Check floor to floor performance time, speed, stopping accuracy and general ride of elevator with no load, balance load and full load in car.
 - (c) Run fully loaded car continuously for a period of 30 minutes, stopping at each floor in both directions for a period of 10 seconds.
 - (d) Check floor to floor performance time, stopping accuracy and general rise with full load, balanced load and no load in car.

In all test conditions, speed and performance times specified shall be met, stopping accuracy shall be maintained without re-leveling and general riding quality shall be acceptable to Project Manager. Temperature rise in windings shall not exceed 50 degrees Celsius above ambient.

- d. Following the proper installation and testing of equipment the contractor shall furnish a certificate of final inspection and approval from the State of Washington.

If there is any question regarding what is required by the City, the contractor shall review the requirements with the City prior to the commencement of any work on the installation. If adequate "Reference Documents" are not already available from the supplier on all equipment used in the installation, the elevator contractor will be required to produce the necessary documents at his own expense to the satisfaction of the owner.

All "Reference Documents" must be submitted directly to the owner at least two weeks prior to final inspection of the elevator. All "Reference Documents" must be organized under separate cover for the elevator unit in logical, indexed sequence for easy reference and bound with a long-lasting, wear resistant cover. In general the required material shall be as follows:

Drawings, Diagrams, Schematics:

- (1) All shop drawings corrected to "as-builts."



- (2) All construction drawings covering all phases of the installation corrected to "as-builts."
- (3) Submit one reproducible transparency and two prints of the complete wiring and schematic diagrams, including all control circuits, key sheets, relay and device function and contact nomenclature and their locations on schematic diagrams, and terminal strip drawings corrected to "as-built." Indicate ohms and watts of resistors; M.F.D. and voltage of capacitors and all circuit voltages.
- (4) All diagrams shall be clearly legible in not-full-size details.
- (5) All drawings, prints and reproducible transparencies to be not less than 24" x 36" or 18" x 24" if drawn to full size.

Manuals of Instruction, etc.:

Submit two (2) copies of each, giving complete descriptive information and instruction manuals, including adjustments and servicing, covering the following where applicable:

- (1) Signal system used, including sequence of operation and adjustment instructions.
- (2) "Door Operator," including electric eye and sensitive edge, its sequence of operation and adjusting instructions.
- (3) Device Function and Description:
 - (a) Device or relay symbol and name.
 - (b) A full description of the function device or relay in the control and signal circuits.
- (4) Hydraulic valve and pumps:
 - (a) Adjusting instructions
 - (b) Oil flow schematic diagrams
- (5) Jack Packing
 - (a) Show cross section of seals and retainer
 - (b) Procedures for packing
- (6) Provide literature for multi-section or inverted cylinder and/or plungers
- (7) Brake, with complete adjusting instructions of model used
- (8) "Position Indicator" if used



- (9) The "Controller", its sequence of operations and adjusting instructions. Submit full adjusting procedures of the variable voltage control if used.
- (10) Summary of all adjustments made by elevator manufacturer, installer and adjuster.
- (11) All engineering bulletins on the equipment installed
- (12) Logic diagrams and schematics of all electronic signal or generator equipment used.

e. Parts Lists:

Submit two (2) copies. Summary parts list, indexed and organized for easy reference to all other documents, covering all parts used in this installation.

f. Machine Room Reference Drawings:

Mount one (1) complete set of approved schematic drawings on 1/4 inch tempered Masonite and cover the entire surface with clear 12 mil Eskalite (Abcolite-ES-12) sheet plastic, available from Sisal Kraft Corporation. Tape edges securely with 1-1/2 inch black plastic tape. Delivery to Owner.

ALL "REFERENCE DOCUMENTS" MUST BE COMPLETED TO THE SATISFACTION OF THE OWNER BEFORE FINAL ACCEPTANCE OF THE ELEVATOR WORK CAN BE MADE. FINAL PAYMENT OF THE CONTRACT CANNOT BE MADE UNTIL THE ELEVATOR WORK IS ACCEPTED.

4. Instructions

- a. Instruct owner's personnel in operation of elevators. Review emergency provisions and procedures. Train Owner's personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions. Confer with Owner on requirements for a complete elevator maintenance program.
- b. Make a final check of each elevator operation, with Owner's personnel present and just prior to date of substantial completion. Determine that control systems and operating devices are functioning properly.

5. Maintenance

- a. The Elevator Contractor shall furnish full maintenance of the elevator equipment for a period of three months (90 days) after completion of the elevator installation. Full maintenance shall include regular weekly examinations of the installation by competent personnel and shall include all necessary adjustments, repairs, lubricating, cleaning and the needed supplies, etc., to keep the equipment in first class condition, except for misuse, accidents, or negligence not caused by the Elevator Contractor.
- b. Supply all special tools, wrenches and gauges as necessary to make adjustments on the equipment.



6. Warranty Inspection

At least 30 days prior to warranty expiration, schedule final inspection and re-test with Owner's representative. Requirement shall include close examination of all equipment.

Replace, repair or adjust any equipment found defective and covered by warranty prior to expiration of warranty period.

End of Section 2